

Module Assembly Procedures

This procedure is for the assembly of L2-5 modules for D0 Run IIb. Module mechanical drawings associated with this work are 399392 (10-10 Axial), 399394 (20-20 Axial), 399596 (10-10 Stereo) and 399430 (20-20 Stereo). The sensor drawing is 399565.

20cm. Gages

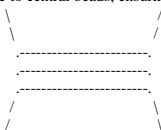
- ❖ Setup 10-10 fixture with AXIAL center puck. Center puck should be pushed back and to the right against the alignment pins and then secured by applying vacuum (white vacuum line). Check that syringe holder is properly mounted to CMM.
- ❖ Wipe down all vacuum surfaces with alcohol and inspect for debris, glue, burrs etc.
- ❖ Run CMM program D0LAYERL2-L5 to establish a coordinate system from the fixture. The reference plane should contain 4 points taken near the extents of each of the 3 vacuum chucks on which the silicon will sit. The 4 pins should be measured in the following order: near left, far left, near right, far right.
- ❖ Record sensor information on traveler and in database.
- ❖ Place silicon on vacuum chucks and secure in place using vacuum on outer chucks only (red and blue vacuum lines).
 - Place left-hand sensor first (3 pins locate sensor in XY). Bond pads along sensor edge should be towards the RIGHT, at the center of the fixture.
 - Place right-hand sensor (2 pins locate sensor in Y only). Bond pads along sensor edge should be towards the LEFT, at the center of the fixture. The right-hand sensor should be placed with its right edge near the edge of the empty dowel pin hole; the right vacuum chuck may need to be moved towards the right to allow extra space at the sensor-sensor joint while placing this sensor.
- ❖ CHECK THAT BOND PADS ARE AT THE SENSOR-SENSOR JOINT.
- ❖ Align left sensor. Centerline fiducials should be located at:
 - X = -99.850, Y = 0.000
 - X = -0.250, Y = 0.000
- ❖ Align right sensor. Centerline fiducials should be located at:
 - X = 99.850, Y = 0.000
 - X = 0.250, Y = 0.000
- ❖ Turn on central vacuum chuck (green vacuum line) and vacuum to end pucks (clear lines) and then verify alignment of both sensors one final time.
- ❖ Mix and degas epoxy
 - Mix TDR1100-11 epoxy (5.0g resin + 2.1g hardener).
 - Transfer to 10cc syringe with orange cap. Do not add plunger yet.
 - Centrifuge for 8 minutes to degas.
 - Check glue station: 40-60 psi, steady, audible back pressure.
 - Install white plunger being careful not to introduce bubbles into epoxy and removing orange cap to allow air out of syringe.
 - Install PURPLE syringe tip.
- ❖ Apply glue to sensor-sensor joint
 - Move CMM to X=0, Y=20.4 (far edge of joint).
 - Adjust OVP magnification to minimum (25X).

- Adjust travel on syringe holder to ~ mid-travel.
- Attach air hose from glue dispenser to syringe.
- Use dispenser to eliminate air from syringe tip.
- Install syringe in holder being careful not to hit silicon with tip. Syringe tip should be located in the lower half of the CMM field of view.
- With syringe tip above sensor surface, move CMM so that the syringe tip is centered on the sensor-sensor gap and about 3-4 tip diameters in from the upper (far) edge of the sensors.
- Use stage on syringe holder to lower syringe onto silicon. The syringe tip will deflect and self-center in the joint. The syringe tip should deflect until it is about 1 tip diameter from the sensor edge.
- Depress glue dispenser foot pedal and move CMM when glue begins flowing from the syringe tip. Move at a steady rate and maintain steady glue flow. The glue should remain well contained in the joint.
- If the glue "disconnects" from the joint and wants to flow on one sensor or the other stop immediately. Move the syringe back over the affected region to wet the glue into the joint. Lift the syringe using the vertical stage and check that the X positioning is still centered over the joint. Adjust as needed. If there is glue on the syringe tip, wipe with a foam swab. Lower the syringe tip, leaving a small gap to the problem region, and resume.
- ❖ Inspect the joint
 - After reaching the end of the joint, raise the syringe.
 - Go back over the joint and inspect it for gaps and over-flow. If there is too little glue in the joint gaps will form at the two ends of the joint. If this is the case, simply add additional glue at the ends of the joint.
 - If fiducials along the edge have been obscured by epoxy they can be wiped carefully with a foam tip swab.
 - If glue has migrated beyond the edge metallization there is a serious problem. {Should we stop here and clean the sensors completely and start over? Or should we flag these for L4, L5 where the depletion voltage and radiation are not a concern?}

10-10 Axial Modules

- ❖ Setup 10-10 fixture with AXIAL center puck. Center puck should be pushed back and to the right against the alignment pins and then secured by applying vacuum (white vacuum line). Check that syringe holder is properly mounted to CMM.
- ❖ Wipe down all vacuum surfaces with alcohol and inspect for debris, glue, burrs etc.
- ❖ Run CMM program D0LAYERL2-L5 to establish a coordinate system from the fixture. The reference plane should contain 4 points taken near the extents of each of the 3 vacuum chucks on which the silicon will sit. The 4 pins should be measured in the following order: near left, far left, near right, far right.
- ❖ Record sensor and hybrid information on traveler and in database.
- ❖ Place silicon on vacuum chucks and secure in place using vacuum on outer chucks only (red and blue vacuum lines).
 - Place left-hand sensor first (3 pins locate sensor in XY). Bond pads along sensor edge should be towards the LEFT, at the outer end of the fixture.
 - Place right-hand sensor (2 pins locate sensor in Y only). Bond pads along sensor edge should be towards the RIGHT, at the outer end of the fixture. The right-hand sensor should be placed with its right edge near the edge of the empty dowel pin hole; the right vacuum chuck may need to be moved towards the right to allow extra space at the sensor-sensor joint while placing this sensor.
- ❖ CHECK THAT THERE ARE NO BOND PADS AT THE SENSOR-SENSOR JOINT. Bond pads should be ~27mm to either side of the joint for the hybrid.
- ❖ Align left sensor. Centerline fiducials should be located at:
 - X = -99.850, Y = 0.000
 - X = -0.250, Y = 0.000
- ❖ Align right sensor. Centerline fiducials should be located at:
 - X = 99.850, Y = 0.000
 - X = 0.250, Y = 0.000
- ❖ Turn on central vacuum chuck (green vacuum line) and vacuum to end pucks (clear lines) and then verify alignment of both sensors one final time.
- ❖ Mount hybrid in alignment jig and attach hybrid handle.
- ❖ Mix and degas epoxy
 - Mix TDR1100-11 epoxy (5.0g resin + 2.1g hardener).
 - Transfer to 10cc syringe with orange cap. Do not add plunger yet.
 - Centrifuge for 8 minutes to degas.
 - Check glue station: 40-60 psi, steady, audible back pressure.
 - Install white plunger being careful not to introduce bubbles into epoxy and removing orange cap to allow air out of syringe.
 - Install PURPLE syringe tip.
- ❖ Apply glue to sensor-sensor joint
 - Move CMM to X=0, Y=20.4 (far edge of joint).
 - Adjust OVP magnification to minimum (25X).
 - Adjust travel on syringe holder to ~ mid-travel.
 - Attach air hose from glue dispenser to syringe.
 - Use dispenser to eliminate air from syringe tip.
 - Install syringe in holder being careful not to hit silicon with tip. Syringe tip should be located in the lower half of the CMM field of view.

- With syringe tip above sensor surface, move CMM so that the syringe tip is centered on the sensor-sensor gap and about 3-4 tip diameters in from the upper (far) edge of the sensors.
- Use stage on syringe holder to lower syringe onto silicon. The syringe tip will deflect and self-center in the joint. The syringe tip should deflect until it is about 1 tip diameter from the sensor edge.
- Depress glue dispenser foot pedal and move CMM when glue begins flowing from the syringe tip. Move at a steady rate and maintain steady glue flow. The glue should remain well contained in the joint.
- If the glue "disconnects" from the joint and wants to flow on one sensor or the other stop immediately. Move the syringe back over the affected region to wet the glue into the joint. Lift the syringe using the vertical stage and check that the X positioning is still centered over the joint. Adjust as needed. If there is glue on the syringe tip, wipe with a foam swab. Lower the syringe tip, leaving a small gap to the problem region, and resume.
- ❖ Inspect the joint
 - After reaching the end of the joint, raise the syringe.
 - Go back over the joint and inspect it for gaps and over-flow. If there is too little glue in the joint gaps will form at the two ends of the joint. If this is the case, simply add additional glue at the ends of the joint.
 - If fiducials along the edge have been obscured by epoxy they can be wiped carefully with a foam tip swab.
- ❖ If glue has migrated beyond the edge metallization there is a serious problem. {Should we stop here and clean the sensors completely and start over? Or should we flag these for L4, L5 where the depletion voltage and radiation are not a concern?}
- ❖ Remove syringe from holder, being careful to do so far from silicon.
- ❖ Swap purple tip for LARGE CHARCOAL tip.
- ❖ Set glue station for 40psi, 14 second pulses.
- ❖ Lift hybrid from alignment tool by the handle and hold upside down to apply glue to bottom surface.
- ❖ Apply glue to hybrid, total of 8 pulses per hybrid
 - Use one pulse each along the end ~3mm wide rectangular raised regions
 - Use 3 pulses each on the wider (~ 1cm) raised regions at each end as shown.
 - First pulse makes upper "U" or "V"-like pattern
 - Second pulse make lower, inverted "U" or "V"-like pattern
 - Third pulse adds glue to central beads, ensuring no gaps or bubbles

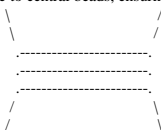


- ❖ Install hybrid on module with HV side of hybrid away from you.
- ❖ Apply weight on hybrid handle (200-400 grams).
- ❖ Let module cure for a minimum of 16 hours.

20-20 Axial Modules

- ❖ Setup 20-20 fixture with AXIAL center puck. Center puck should be pushed back and to the right against the alignment pins and then secured by applying vacuum (white vacuum line). Check that syringe holder is properly mounted to CMM.
- ❖ Wipe down all vacuum surfaces with alcohol and inspect for debris, glue, burrs etc.
- ❖ Run CMM program D0LAYERL2-L5 to establish a coordinate system from the fixture. The reference plane should contain 4 points taken near the extents of each of the 3 vacuum chucks on which the silicon will sit. The 4 pins should be measured in the following order: near left, far left, near right, far right.
- ❖ Record sensor and hybrid information on traveler and in database.
- ❖ Place 20cm. gangs on vacuum chucks and secure in place using vacuum on outer chucks only (red and blue vacuum lines).
 - Place left-hand 20cm gang first (3 pins locate sensor in XY).
 - Place right-hand 20 cm. gang (2 pins locate sensor in Y only). The right-hand sensor should be placed with its right edge near the edge of the empty dowel pin hole; the right vacuum chuck may need to be moved towards the right to allow extra space at the sensor-sensor joint while placing this sensor.
- ❖ CHECK THAT THERE ARE NO BOND PADS AT THE SENSOR-SENSOR JOINT. Bond pads should be ~27mm to either side of the joint for the hybrid.
- ❖ Align left sensor. Centerline fiducials should be located at:
 - X = -199.950, Y = 0.000 (X = -100.35 X = -99.850 as well)
 - X = -0.250, Y = 0.000
- ❖ Align right sensor. Centerline fiducials should be located at:
 - X = 199.950, Y = 0.000 (X = 100.35 X = 99.850 as well)
 - X = 0.250, Y = 0.000
- ❖ Turn on central vacuum chuck (green vacuum line) and vacuum to end pucks (clear lines) and then verify alignment of both 20cm gangs one final time.
- ❖ Mount hybrid in alignment jig and attach hybrid handle.
- ❖ Mix and degas epoxy
 - Mix TDR1100-11 epoxy (5.0g resin + 2.1g hardener).
 - Transfer to 10cc syringe with orange cap. Do not add plunger yet.
 - Centrifuge for 8 minutes to degas.
 - Check glue station: 40-60 psi, steady, audible back pressure.
 - Install white plunger being careful not to introduce bubbles into epoxy and removing orange cap to allow air out of syringe.
 - Install PURPLE syringe tip.
- ❖ Apply glue to sensor-sensor joint
 - Move CMM to X=0, Y=20.4 (far edge of joint).
 - Adjust OVP magnification to minimum (25X).
 - Adjust travel on syringe holder to ~ mid-travel.
 - Attach air hose from glue dispenser to syringe.
 - Use dispenser to eliminate air from syringe tip.
 - Install syringe in holder being careful not to hit silicon with tip. Syringe tip should be located in the lower half of the CMM field of view.

- With syringe tip above sensor surface, move CMM so that the syringe tip is centered on the sensor-sensor gap and about 3-4 tip diameters in from the upper (far) edge of the sensors.
- Use stage on syringe holder to lower syringe onto silicon. The syringe tip will deflect and self-center in the joint. The syringe tip should deflect until it is about 1 tip diameter from the sensor edge.
- Depress glue dispenser foot pedal and move CMM when glue begins flowing from the syringe tip. Move at a steady rate and maintain steady glue flow. The glue should remain well contained in the joint.
- If the glue "disconnects" from the joint and wants to flow on one sensor or the other stop immediately. Move the syringe back over the affected region to wet the glue into the joint. Lift the syringe using the vertical stage and check that the X positioning is still centered over the joint. Adjust as needed. If there is glue on the syringe tip, wipe with a foam swab. Lower the syringe tip, leaving a small gap to the problem region, and resume.
- ❖ Inspect the joint
 - After reaching the end of the joint, raise the syringe.
 - Go back over the joint and inspect it for gaps and over-flow. If there is too little glue in the joint gaps will form at the two ends of the joint. If this is the case, simply add additional glue at the ends of the joint.
 - If fiducials along the edge have been obscured by epoxy they can be wiped carefully with a foam tip swab.
- ❖ If glue has migrated beyond the edge metallization there is a serious problem. {Should we stop here and clean the sensors completely and start over? Or should we flag these for L4, L5 where the depletion voltage and radiation are not a concern?}
- ❖ Remove syringe from holder, being careful to do so far from silicon.
- ❖ Swap purple tip for LARGE CHARCOAL tip.
- ❖ Set glue station for 40psi, 14 second pulses.
- ❖ Lift hybrid from alignment tool by the handle and hold upside down to apply glue to bottom surface.
- ❖ Apply glue to hybrid, total of 8 pulses per hybrid
 - Use one pulse each along the end ~3mm wide rectangular raised regions
 - Use 3 pulses each on the wider (~ 1cm) raised regions at each end as shown.
 - First pulse makes upper "U" or "V"-like pattern
 - Second pulse make lower, inverted "U" or "V"-like pattern
 - Third pulse adds glue to central beads, ensuring no gaps or bubbles

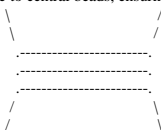


- ❖ Install hybrid on module with HV side of hybrid away from you.
- ❖ Apply weight on hybrid handle (200-400 grams).
- ❖ Let module cure for a minimum of 16 hours.

10-10 Stereo Modules

- ❖ Setup 10-10 fixture with STEREO center puck. Center puck should be pushed back and to the right against the alignment pins and then secured by applying vacuum (white vacuum line). Check that syringe holder is properly mounted to CMM.
- ❖ Wipe down all vacuum surfaces with alcohol and inspect for debris, glue, burrs etc.
- ❖ Run CMM program D0LAYERL2-L5 to establish a coordinate system from the fixture. The reference plane should contain 4 points taken near the extents of each of the 3 vacuum chucks on which the silicon will sit. The 4 pins should be measured in the following order: near left, far left, near right, far right.
- ❖ Record sensor and hybrid information on traveler and in database.
- ❖ Place silicon on vacuum chucks and secure in place using vacuum on outer chucks only (red and blue vacuum lines).
 - Place left-hand sensor first (3 pins locate sensor in XY). Bond pads along sensor edge should be towards the LEFT, at the outer end of the fixture.
 - Place right-hand sensor (2 pins locate sensor in Y only). Bond pads along sensor edge should be towards the RIGHT, at the outer end of the fixture. The right-hand sensor should be placed with its right edge near the edge of the empty dowel pin hole; the right vacuum chuck may need to be moved towards the right to allow extra space at the sensor-sensor joint while placing this sensor.
- ❖ CHECK THAT THERE ARE NO BOND PADS AT THE SENSOR-SENSOR JOINT. Bond pads should be ~27mm to either side of the joint for the hybrid.
- ❖ Align left sensor. Offset fiducials (lower) should be located at:
 - X = -99.850, Y = 0.000
 - X = -0.250, Y = 0.000
- ❖ Align right sensor. Offset fiducials (upper) should be located at:
 - X = 99.850, Y = 0.000
 - X = 0.250, Y = 0.000
- ❖ Turn on central vacuum chuck (green vacuum line) and vacuum to end pucks (clear lines) and then verify alignment of both sensors one final time.
- ❖ Mount hybrid in alignment jig and attach hybrid handle.
- ❖ Mix and degas epoxy
 - Mix TDR1100-11 epoxy (5.0g resin + 2.1g hardener).
 - Transfer to 10cc syringe with orange cap. Do not add plunger yet.
 - Centrifuge for 8 minutes to degas.
 - Check glue station: 40-60 psi, steady, audible back pressure.
 - Install white plunger being careful not to introduce bubbles into epoxy and removing orange cap to allow air out of syringe.
 - Install PURPLE syringe tip.
- ❖ Apply glue to sensor-sensor joint
 - Move CMM to X=0, Y=18.0 (far edge of joint).
 - Adjust OVP magnification to minimum (25X).
 - Adjust travel on syringe holder to ~ mid-travel.
 - Attach air hose from glue dispenser to syringe.
 - Use dispenser to eliminate air from syringe tip.
 - Install syringe in holder being careful not to hit silicon with tip. Syringe tip should be located in the lower half of the CMM field of view.

- With syringe tip above sensor surface, move CMM so that the syringe tip is centered on the sensor-sensor gap and about 3-4 tip diameters in from the upper (far) edge of the sensors.
- Use stage on syringe holder to lower syringe onto silicon. The syringe tip will deflect and self-center in the joint. The syringe tip should deflect until it is about 1 tip diameter from the sensor edge.
- Depress glue dispenser foot pedal and move CMM when glue begins flowing from the syringe tip. Move at a steady rate and maintain steady glue flow. The glue should remain well contained in the joint.
- If the glue "disconnects" from the joint and wants to flow on one sensor or the other stop immediately. Move the syringe back over the affected region to wet the glue into the joint. Lift the syringe using the vertical stage and check that the X positioning is still centered over the joint. Adjust as needed. If there is glue on the syringe tip, wipe with a foam swab. Lower the syringe tip, leaving a small gap to the problem region, and resume.
- ❖ Inspect the joint
 - After reaching the end of the joint, raise the syringe.
 - Go back over the joint and inspect it for gaps and over-flow. If there is too little glue in the joint gaps will form at the two ends of the joint. If this is the case, simply add additional glue at the ends of the joint.
 - If fiducials along the edge have been obscured by epoxy they can be wiped carefully with a foam tip swab.
- ❖ If glue has migrated beyond the edge metallization there is a serious problem. {Should we stop here and clean the sensors completely and start over? Or should we flag these for L4, L5 where the depletion voltage and radiation are not a concern?}
- ❖ Remove syringe from holder, being careful to do so far from silicon.
- ❖ Swap purple tip for LARGE CHARCOAL tip.
- ❖ Set glue station for 40psi, 14 second pulses.
- ❖ Lift hybrid from alignment tool by the handle and hold upside down to apply glue to bottom surface.
- ❖ Apply glue to hybrid, total of 8 pulses per hybrid
 - Use one pulse each along the end ~3mm wide rectangular raised regions
 - Use 3 pulses each on the wider (~ 1cm) raised regions at each end as shown.
 - First pulse makes upper "U" or "V"-like pattern
 - Second pulse make lower, inverted "U" or "V"-like pattern
 - Third pulse adds glue to central beads, ensuring no gaps or bubbles

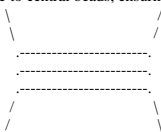


- ❖ Install hybrid on module with HV side of hybrid away from you.
- ❖ Apply weight on hybrid handle (200-400 grams).
- ❖ Let module cure for a minimum of 16 hours.

20-20 Stereo Modules

- ❖ Setup 20-20 fixture with STEREO center puck. Center puck should be pushed back and to the right against the alignment pins and then secured by applying vacuum (white vacuum line). Check that syringe holder is properly mounted to CMM.
- ❖ Wipe down all vacuum surfaces with alcohol and inspect for debris, glue, burrs etc.
- ❖ Run CMM program D0LAYERL2-L5 to establish a coordinate system from the fixture. The reference plane should contain 4 points taken near the extents of each of the 3 vacuum chucks on which the silicon will sit. The 4 pins should be measured in the following order: near left, far left, near right, far right.
- ❖ Record sensor and hybrid information on traveler and in database.
- ❖ Place 20cm. gangs on vacuum chucks and secure in place using vacuum on outer chucks only (red and blue vacuum lines).
 - Place left-hand 20cm gang first (3 pins locate sensor in XY).
 - Place right-hand 20 cm. gang (2 pins locate sensor in Y only). The right-hand sensor should be placed with its right edge near the edge of the empty dowel pin hole; the right vacuum chuck may need to be moved towards the right to allow extra space at the sensor-sensor joint while placing this sensor.
- ❖ CHECK THAT THERE ARE NO BOND PADS AT THE SENSOR-SENSOR JOINT. Bond pads should be ~27mm to either side of the joint for the hybrid.
- ❖ Align left sensor. Offset fiducials (lower) should be located at:
 - X = -199.950, Y = 0.000 (X = -100.35 X = -99.850 as well)
 - X = -0.250, Y = 0.000
- ❖ Align right sensor. Offset fiducials (upper) should be located at:
 - X = 199.950, Y = 0.000 (X = 100.35 X = 99.850 as well)
 - X = 0.250, Y = 0.000
- ❖ Turn on central vacuum chuck (green vacuum line) and vacuum to end pucks (clear lines) and then verify alignment of both 20cm gangs one final time.
- ❖ Mount hybrid in alignment jig and attach hybrid handle.
- ❖ Mix and degas epoxy
 - Mix TDR1100-11 epoxy (5.0g resin + 2.1g hardener).
 - Transfer to 10cc syringe with orange cap. Do not add plunger yet.
 - Centrifuge for 8 minutes to degas.
 - Check glue station: 40-60 psi, steady, audible back pressure.
 - Install white plunger being careful not to introduce bubbles into epoxy and removing orange cap to allow air out of syringe.
 - Install PURPLE syringe tip.
- ❖ Apply glue to sensor-sensor joint
 - Move CMM to X=0, Y=18.0 (far edge of joint).
 - Adjust OVP magnification to minimum (25X).
 - Adjust travel on syringe holder to ~ mid-travel.
 - Attach air hose from glue dispenser to syringe.
 - Use dispenser to eliminate air from syringe tip.
 - Install syringe in holder being careful not to hit silicon with tip. Syringe tip should be located in the lower half of the CMM field of view.

- With syringe tip above sensor surface, move CMM so that the syringe tip is centered on the sensor-sensor gap and about 3-4 tip diameters in from the upper (far) edge of the sensors.
- Use stage on syringe holder to lower syringe onto silicon. The syringe tip will deflect and self-center in the joint. The syringe tip should deflect until it is about 1 tip diameter from the sensor edge.
- Depress glue dispenser foot pedal and move CMM when glue begins flowing from the syringe tip. Move at a steady rate and maintain steady glue flow. The glue should remain well contained in the joint.
- If the glue "disconnects" from the joint and wants to flow on one sensor or the other stop immediately. Move the syringe back over the affected region to wet the glue into the joint. Lift the syringe using the vertical stage and check that the X positioning is still centered over the joint. Adjust as needed. If there is glue on the syringe tip, wipe with a foam swab. Lower the syringe tip, leaving a small gap to the problem region, and resume.
- ❖ Inspect the joint
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 - Go back over the joint and inspect it for gaps and over-flow. If there is too little glue in the joint gaps will form at the two ends of the joint. If this is the case, simply add additional glue at the ends of the joint.
 - If fiducials along the edge have been obscured by epoxy they can be wiped carefully with a foam tip swab.
- ❖ If glue has migrated beyond the edge metallization there is a serious problem. {Should we stop here and clean the sensors completely and start over? Or should we flag these for L4, L5 where the depletion voltage and radiation are not a concern?}
- ❖ Remove syringe from holder, being careful to do so far from silicon.
- ❖ Swap purple tip for LARGE CHARCOAL tip.
- ❖ Set glue station for 40psi, 14 second pulses.
- ❖ Lift hybrid from alignment tool by the handle and hold upside down to apply glue to bottom surface.
- ❖ Apply glue to hybrid, total of 8 pulses per hybrid
 - Use one pulse each along the end ~3mm wide rectangular raised regions
 - Use 3 pulses each on the wider (~ 1cm) raised regions at each end as shown.
 - First pulse makes upper "U" or "V"-like pattern
 - Second pulse make lower, inverted "U" or "V"-like pattern
 - Third pulse adds glue to central beads, ensuring no gaps or bubbles



- ❖ Install hybrid on module with HV side of hybrid away from you.
 - ❖ Apply weight on hybrid handle (200-400 grams).
- Let module cure for a minimum of 16 hours.